BC 569976 thru
569981

P.O. 46-926519

Sierra 160

COAXIAL LOADS

OPERATION/MAINTENANCE MANUAL

SMM-160

ISSUE 3

OFFICIAL RECORDS STATION
FILE COPY
FACILITIES MAY 12 1976

802516000C

PHILCO Ford

SIERRA ELECTRONIC OPERATION
3885 Bohannon Drive
Menlo Park, California 94025
(415) 322-7222/TWX 910-373-1282

Sierra 160

COAXIAL LOADS

OPERATION/MAINTENANCE MANUAL

SMM-160

ISSUE 3

B02516000C

PHILCO Ford

SIERRA ELECTRONIC OPERATION
3885 Bohannon Drive
Menlo Park, California, 94025
(415) 322-7222/TWX 910-373-1282

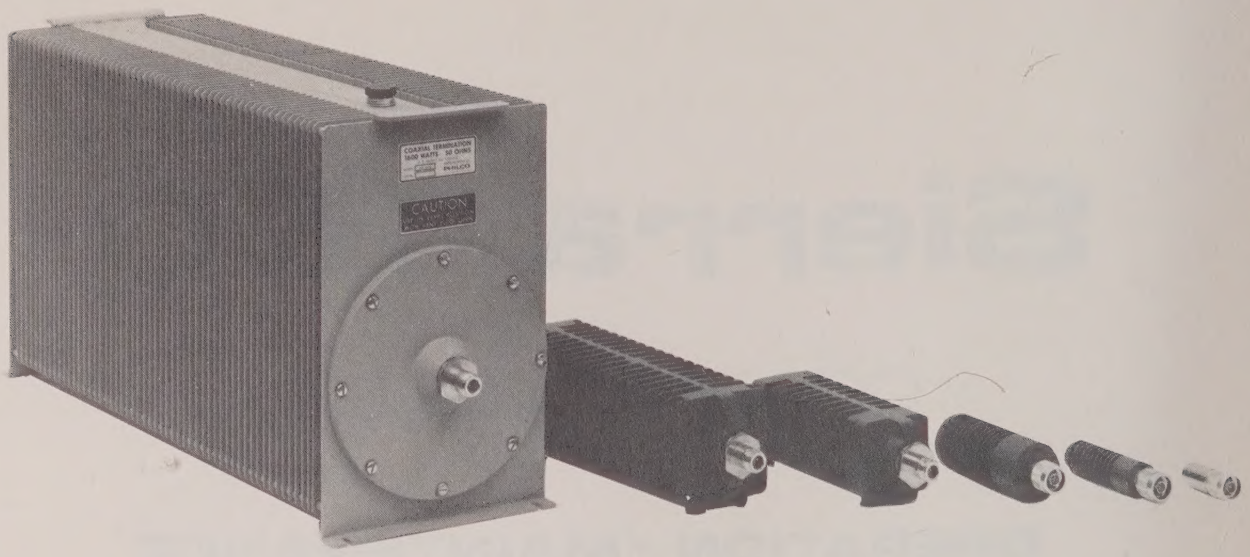


Figure 1. Sierra 160 Series Coaxial Loads

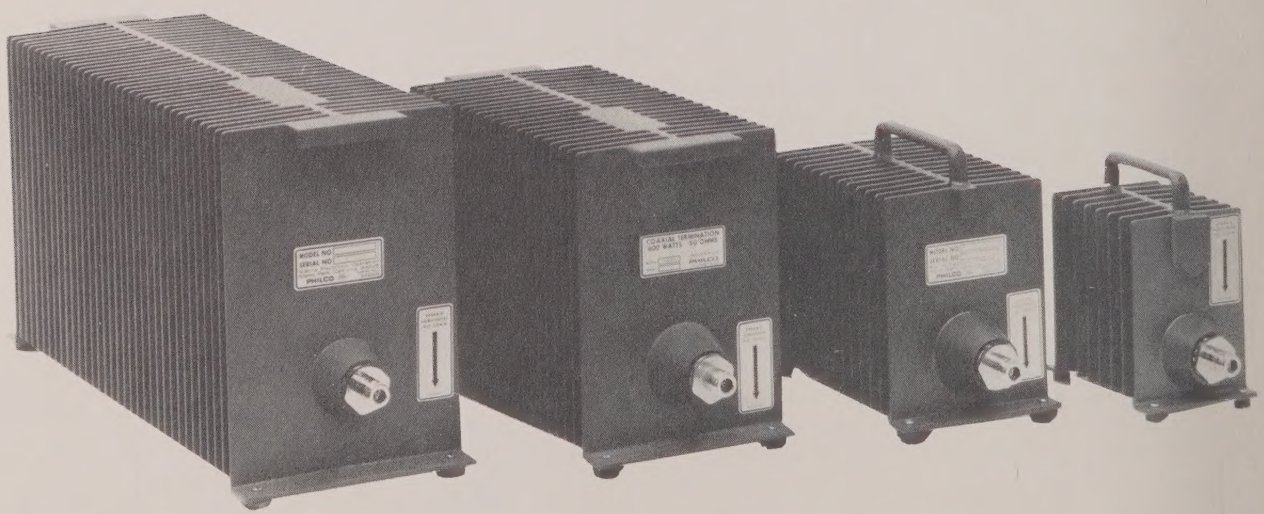


Figure 2. Sierra 160B Series Coaxial Loads

160/160B SERIES COAXIAL LOADS OPERATION AND MAINTENANCE

CONTENTS PAGE

1. GENERAL 1
2. PHYSICAL DESCRIPTION 1
3. SPECIFICATIONS 2
4. OPERATION 2
Preparation For Use 2
Operation 3
Repacking 4
5. CIRCUIT DESCRIPTION 4
6. MAINTENANCE 4
7. REPLACEMENT PARTS LIST 5

1. GENERAL

1.01 This manual contains information pertinent to the use and servicing of the Sierra 160 and 160B series coaxial loads. Included are a description, specifications, maintenance instructions, and a replaceable parts list.

1.02 The principal features of these loads are:

- Low VSWR
- High stability
- Broad frequency coverage
- Completely sealed to prevent r-f leakage
- Twist-off connectors (all but three)

1.03 The Sierra 160 series (except model 1600) coaxial loads are dry loads, using air as the dielectric coolant. The live models in this series have average power dissipation ratings of 2, 5, 20, 50, and 100 watts, respectively. The model 1600 has an average power dissipation rating of 1600 watts. The loads are used in r-f applications which require stable 50-ohm terminations with very low VSWR. All models employ air convention cooling. Because they contain no liquid coolant, dry loads will operate with maximum efficiency in any position. They are ideally suited for all types of testing and measurement at signal generator and power signal source levels where an accurate, stable 50-ohm coaxial load is required. Small CW, AM, FM, TV or radar transmitters as well as aeronautic, navigational and meteorological transmitters may be tested, aligned, adjusted, or put in dummy load operation using these terminations. Since the r-f field is completely enclosed by the load body, there is an absolute minimum of r-f leakage in these applications.

1.04 The Sierra 160B series coaxial loads are wet loads, using silicone fluid as the dielectric coolant. The four models in this series have average power dissipation ratings of 150, 300, 600, and 1000 watts. They provide low reflection termination of a 50-ohm flexible or rigid coaxial line. They are ideally suited as dummy loads for transmitters operating up to 5 GHz, or as terminations for use with bi-directional power monitors such as the Sierra 164B or 400A.

1.05 All nine loads are rugged, long-life, electrically stable units, exhibiting very low VSWR from dc to 4 and 5 GHz.

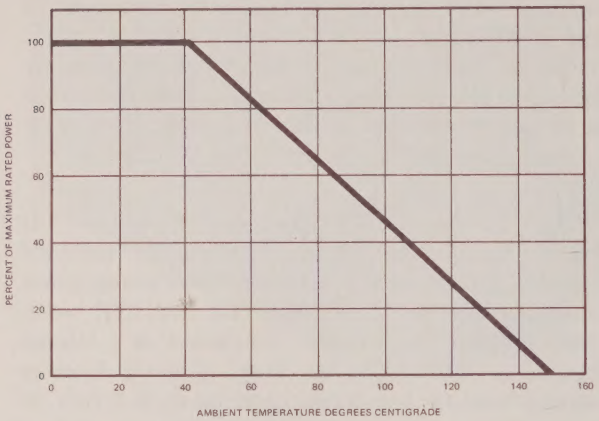
2. PHYSICAL DESCRIPTION

2.01 Each coaxial load consists of metal-film power resistor housed in a cast-aluminum body. One end of the resistor is connected to the center conductor of a coaxial input connector, and the other end, to the outer conductor, through the body.

2.02 All but three models are equipped with twist-off connectors to permit hookup to a variety of circuit terminations. The 160-2, 160-5 and the 160-20 come only with permanently attached type N connectors, either male or female as ordered.

2.03 Around the resistor is a precision shaped cavity. In five models (dry load) the cavity contains only air, in the other four models (wet load) the cavity contains silicone fluid to conduct the heat to the body. High stability at full-rated power is obtained by the use of aluminum as the body material. Finned construction provides a maximum heat radiation capability. Even at ambient temperatures up to 40°C, these terminations will continuously dissipate full rated power. Above 40°C they will still operate at optimum efficiency at reduced power

input. The all-metal, non-porous housing confines dangerous fields to the interior of the loads for maximum freedom from radiation.



2.04 Figure 4 shows the various types of twist-off connectors available.

3. SPECIFICATIONS

3.01 The specifications for the Sierra 160 series coaxial loads are given in Table 1. The specifications for the Sierra 160B series coaxial loads are given in Table 2.

4. OPERATION

Preparation For Use

4.01 This unit is packaged for inside storage only, at ambient temperatures between -30°C and +150°C.

4.02 Carefully unpack the load and inspect it for damage. Retain the shipping carton. Check the equipment received against the order. If any evidence of damage is observed or the load does not operate properly, contact the Sierra Customer Service Department for instructions.

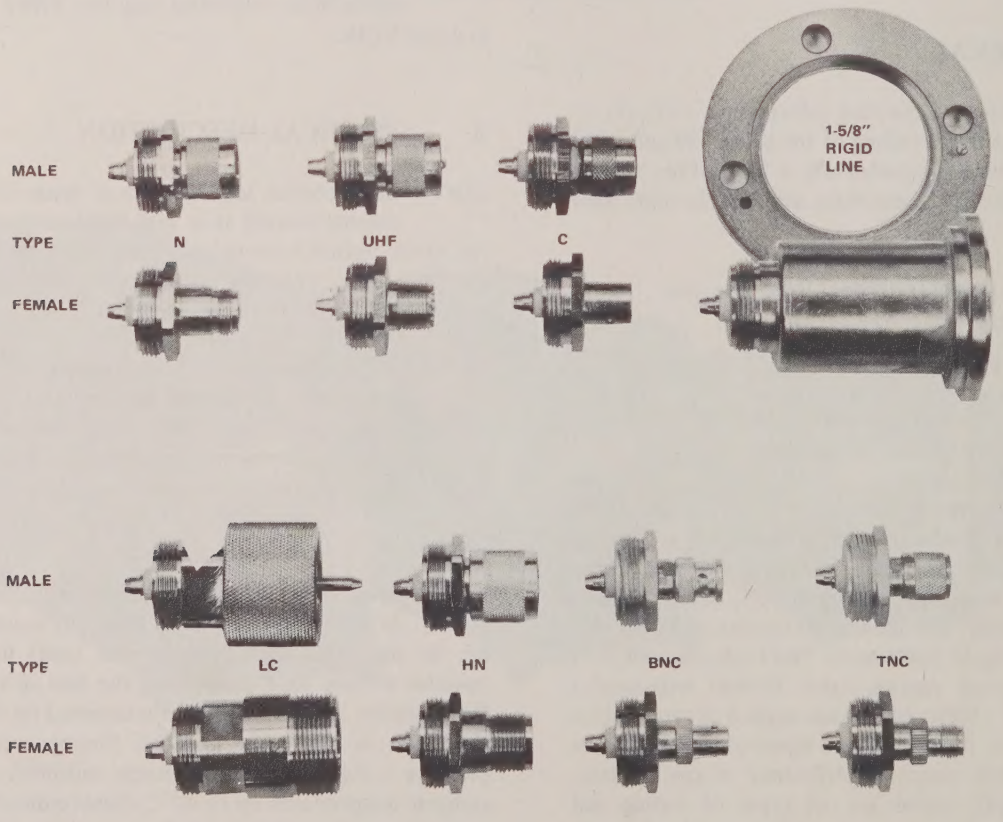


Figure 4. Twist-Off Connectors

Table 1. Sierra 160 Series Coaxial Loads, Specifications

	160-2	160-5	160-20	160-50D	160-100D	160-1600
Nominal Impedance	50 Ohms	50 Ohms	50 Ohms	50 Ohms	50 Ohms	50 Ohms
Power Rating (at 40°C)	1 W	5 W	20 W	50 W	100 W	1600 W
Peak Power Rating	1 kW	5 kW	10 kW			
With BNC or TNC Connector				2.5 kW	2.5 kW	2.5 kW
With N or C Connector				10 kW	10 kW	10 kW
With HN or LC Connector				50 kW	100 kW	250 kW
With 1-5/8" Rigid Line				50 kW	100 kW	1000 kW
Connector Types (Male & Female)	FN or MN; Specify	FN or MN; Specify	FN or MN; Specify	Twist-Off* Female Type N Standard	Twist Off* Female Type N Standard	Twist-Off* Female Type N Standard
Frequency Range	DC to 11 GHz	DC to 4 GHz	DC to 4 GHz	DC to 4 GHz	DC to 4 GHz	DC to 1 GHz
VSWR	1.1 to 4 GHz 1.15 to 6 GHz 1.25 to 11 GHz	1.1 to 1 GHz 1.2 to 4 GHz	1.1 to 1 GHz 1.2 to 4 GHz	1.1 to 1 GHs 1.2 to 4 GHz	1.1 to 1 GHz 1.2 to 4 GHz	1.15
Overload Average Power (Minutes) — 50%	5	5	5	5	5	20
100%	1	1	1	1	1	5
Temperature Rating (all models)	40°C maximum ambient 100% of rated power 95°C maximum ambient 50% of rated power					
Size (Inches)						
Diameter	3/4	1	1-5/8			
Length	1-3/4	3-1/8	4-1/2	7-3/8	11-1/2	23-1/2
Height				2-1/2	3-3/4	11-1/4
Width				2-1/4	3	7
Weight	3 oz.	4-1/2 oz.	8 oz.	1-1/2 lbs.	3-1/2 lbs.	38 lbs.

*Twist-Off connectors available: Type C, N, HN, LC, BNC, TNC, UHF, 1-5/8" rigid line, male and female

ADDRESS: Customer Service Department
Sierra Electronic Operation
3885 Bohannon Drive
Menlo Park, California 94025
Phone: (415) 322-7222
TWX: 910-373-1282

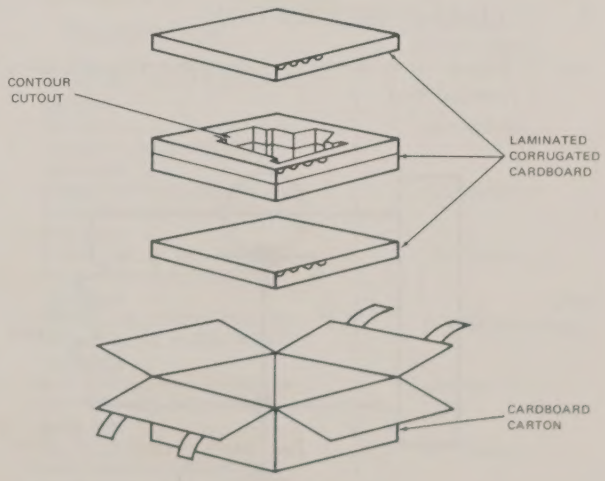


Figure 5. Shipping Container

Operation

4.03 The dry loads may be operated in any position; the wet loads, only with the base down.

Table 2. Sierra 160B Series Coaxial Loads, Specifications

	160B-150	160B-300	160B-600	160B-1000
Power Rating (at 40°C)	150 watts	300 watts	600 watts	1000 watts
Average Overload Power (Minutes) - 50%	5	5	5	5
100%	1	1	1	1
Peak Power Rating With BNC or TNC Connector	2.5 kW	2.5 kW	2.5 kW	2.5 kW
With N or C Connector	10 kW	10 kW	10 kW	10 kW
With HN or LC Connector	75 kW	150 kW	250 kW	250 kW
With 1-5/8" Rigid Line	75 kW	150 kW	250 kW	250 kW
Frequency Ranges	DC to 4 GHz	DC to 3 GHz	DC to 3 GHz	DC to 3 GHz
Maximum VSWR (with N(F) connector)	1.1 DC to 500 MHz 1.2 500 to 4 GHz	1.1 DC to 1 GHz 1.2 1000 to 3 GHz	1.1 DC to 1 GHz 1.2 1000 to 3 GHz	1.1 DC to 1 GHz 1.2 1000 to 3 GHz
Nominal Impedance	50 ohms	50 ohms	50 ohms	50 ohms
Connector Types	Twist-Off*	Twist-Off*	Twist-Off*	Twist-Off*
Dimensions (Inches)				
Width	3-1/2	4-7/8	6	6-3/8
Height	6	7-3/8	8-1/4	9-3/8
Length	6-1/2	9-3/4	14	20
Weight	2-3/4 pounds	6-3/4 pounds	15-1/2 pounds	29-1/2 pounds

*Twist-Off connectors are available in types N, UHF, C, LC, HN, BNC, TNC and 1-5/8-inch rigid line.

Repacking

4.04 Repackage unit in accordance with Figure 5. Seal securely with tape.

5. CIRCUIT DESCRIPTION

5.01 Figure 6 is a typical schematic diagram of a coaxial load.

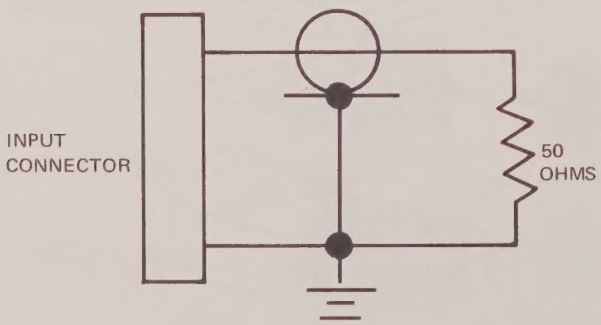


Figure 6. Coaxial Load, Typical Schematic Diagram

6. MAINTENANCE

6.01 The following procedures cover inspection and servicing of the coaxial loads.

Step 1
Visually inspect connector for bent or worn center conductor, or for damaged threads (or other fastening devices).

NOTE: Steps 2, 3 and 4 do not apply to models 160-1, 160-5 or 160-20.

Step 2
Replace worn or damaged connectors as follows:

a. Using a 1-1/8" open end or box wrench, remove connector shell.

NOTE: Insert may come away with shell, or may remain in coaxial load.

b. Remove insert from shell or coaxial load, as applicable.

c. Discard and replace damaged or worn connector.

d. Thread connector shell into coaxial load until tight.

NOTE: Apply small amount of lubriplate to threads.

e. Measure dc resistance between connector shell and center conductor resistance should be 50 ±2 ohms.

Step 3
Visually inspect areas around connectors and plug for evidence of leaks.

Step 4
Replace oil in coaxial load, as required, as follows:

a. Place unit on work surface with plug facing up.

b. Using a 7/8" open end or box wrench, remove plug.

c. Insert unit over drain pan and allow oil to drain completely.

d. Re-invert unit and fill with dielectric fluid in accordance with Table 3.

e. Replace plug.

7. REPLACEMENT PARTS LIST

7.01 The connectors listed in Table 4 are specifically designed to fit the r-f load if other than the female type "N" connector is required. Each connector consists of two major parts: a shell (outer conductor) and an insert (center conductor with insulator sleeve).

Table 3. Dielectric Coolant

MODEL	QUANTITY	TYPE
160B-150	75cc ±2cc	DC No. 200 Dow Corning 1.5 Centistolces Viscosity
160B-300	191cc ±3cc	Shell Diala Ax Oil
160B-600	450cc ±5cc	DC No. 200 Dow Corning 1.5 Centistolces Viscosity
160B-1000	805cc ±5cc	DC No. 200 Dow Corning 1.5 Centistolces Viscosity
160-1600	6200cc ±10 cc	Shell Diala Ax Oil

Table 4. Replaceable Parts List

DESCRIPTION	SIERRA STOCK NO.	DESCRIPTION	SIERRA STOCK NO.
"Twist-Off" R-F Connectors		PRIMARY LOAD RESISTORS	
		160-50D	
N	914600012 male 914600013 female	RESISTOR, 50 ohm ±1%, Per Sierra drawing A02827507	907500028
		160-100D	
C	914600082 male 914600081 female	RESISTOR, 50 ohm ±1%, Per Sierra drawing A02827505	907500026
		160-1600	
UHF	914600022 male 914600023 female	RESISTOR, 25 ohm ±2% (2) Sierra drawing A02827506	907500027
		160B-150	
HN	914600078 male 914600079 female	RESISTOR, 50 ohm ±2%, Per Sierra drawing A02827508	907500029
		160B-300	
LC	914600080 male 914600075 female	RESISTOR, 50 ohm ±2%, Per Sierra drawing A02827510	907500031
		160B-600	
BNC	914600083 male 914600076 female	RESISTOR, 50 ohm ±2%, Per Sierra drawing A02827509	907500030
		160B-1000	
TNC	914600085 male 914600084 female	RESISTOR, 50 ohm ±2%, Per Sierra drawing A02827511	907500032
1-5/8" Rigid Line	914600071		

Digitized by the Internet Archive
in 2025

https://archive.org/details/manualsplus_05460

Warranty

SIERRA ELECTRONIC OPERATION, PHILCO-FORD CORPORATION warrants products manufactured by it to be free from defects in material and workmanship and to meet the applicable specifications under normal use and service for a period of 12 months from the date of original shipment by us. Our obligation under this warranty is limited to the repair or replacement of such products which, after having been returned to the factory or a point designated by us, shall be examined and in our sole opinion, found defective and that such defect was not induced by causes external to the product. Alternately, SIERRA may elect to issue credit for any such defective product.

All products to be repaired or replaced shall be returned prepaid to the designated place of repair in accordance with authorization and packing and shipping instructions issued by SIERRA. Return shall not be made until such authorization and instructions are issued. Each returned product shall be accompanied by a statement or report fully stating the claimed defects and any other pertinent information concerning the failure.

SIERRA'S responsibility under this warranty does not apply to any products which have been repaired, worked upon or altered by persons not authorized by us so as to in our sole judgement, injure the stability or reliability of such product, or which have been subject to misuse, negligence or accident, or where applicable, the serial number has been altered, effaced or removed. SIERRA shall not be liable for damages resulting from the use of the purchased product, nor shall SIERRA be responsible for any failure in the performance of other items to which the purchased product is connected or the functioning of an entire system or parts of any system of which the purchased product may be a part.

SIERRA reserves the right to make changes in the design or construction of any of its products at any time without incurring any obligation to make changes whatever on units previously purchased. Accessories, including but not limited to all vacuum tubes, fuses, pilot lamps and batteries used with our products are not covered by this warranty. A test setup charge of $25.00 will apply to any returned instrument or microwave component which, after test, is found to meet the applicable specifications.

This warranty is in lieu of all other warranties, expressed, implied or statutory. No representative or person is authorized to represent nor assume for SIERRA any liability in connection with the sale of products other than set forth herein. IN NO EVENT SHALL SIERRA BE LIABLE FOR SPECIAL INCIDENTAL OR CONSEQUENTIAL DAMAGES.